Dealing with Environmental Challenges Collectively:

The Loweswater Care Project

Community Catchment Management at Loweswater, Cumbria

This booklet is dedicated to the memory of Danny Leck

This publication was produced by Loweswater Care Project participants. It aims to document the LCP's innovative ways of working, and to highlight the achievements and insights gained from understanding and acting collectively in Loweswater to address complex environmental issues.

Main: Loweswater.
Photo: Getmapping.com.

Inset: Danny Leck (middle) discussing new septic tanks with farmers, 2007.

Covers:
Photo: John Macfarlane.

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Right: Installing the monitoring buoy on Loweswater.
Photo: Stephen Maberly.

Foreword

Over the last 50 years or so, farming practices and indeed the way of life in rural areas have altered dramatically. So too has the environment in which these changes have played out.

A number of years have passed since local people began to consider how to improve the water quality of Loweswater, beginning with eleven farmers working together, led by the late Danny Leck back in 2002.

This booklet explains what has been attempted by local people working together with scientists and agencies since then and in the form of the Loweswater Care Project. It gives a voice to these diverse participants to show how they have collaborated and presents some of the findings that have come to the fore and the things they have achieved. It also considers what practical and viable ways forward there may be to better understand and act on complex environmental issues.

Together, we carried out various surveys and monitoring programmes, recognising certain issues, some of which have been addressed. But it must be understood that bettering the quality of the lake will not be a quick fix.

Kath Leck

Right: The physical 'catchment' of Loweswater, a small lake in the English Lake District, is defined as the area within which water flows towards the lake.
The catchment is delineated here by the red line.
Photo: Lisa Norton.

Introducing Loweswater

David Davies,
Thackthwaite,
Loweswater

Life in Loweswater, for those fortunate enough to be able to live there, is good. Loweswater is undoubtedly one of the most beautiful valleys in England, with stunning mountains, fast-running becks, rugged fells and the unique sense of place that is associated with "the Lakes". Around 200 people reside in the parish (2001 Census), with around a quarter of that number permanently resident in the physical catchment of Loweswater. Despite its small size and relatively remote locality, a wealth of local activities are enjoyed by Loweswater residents – often in combination with nearby villages – from gardening clubs to rambling societies to local history fraternities.

Loweswater, like most rural settlements, has a complex social make-up, the people living here come from very varied backgrounds. Not so long ago, the valley was a site of major mining installations, and it was host to textile, brewing, tanning, and fulling industries and a diverse agriculture. Its people came from both the near locality and from far away across the UK and beyond. Now, the social make-up of the catchment is less determined by working opportunities but the valley still supports a diverse community.

What one sees if one looks closely at this lovely place is that - like many rural areas in our highly modernised society - it harbours a mass of seeming contradictions and paradoxes. The lake, the land, the farms, the mountains, the rivers, the stone-walled fields, the sheep and the wild animals signify the rurality of the catchment – a simple-looking rurality that is highly prized in the beautiful Lake District National Park. Yet in many respects Loweswater is no less complex a place than a district of a large metropolitan centre. As we shall see later on in this publication, issues of housing, work, population and the environment constantly raise challenges in this rural setting just as they do in our cities.

For example, as for many rural parishes today, very few residents are able to earn a living within Loweswater. There has been some development in tourism in the parish (a hotel, local B&Bs, as well as a camping barn are thriving) providing some jobs, but there are few other services to be found here. Life in the valley relies heavily on the infrastructures of local towns that are within reach. Local property prices reflect market desirability and have the unfortunate effect of pricing young local people with families out of the area. Forms of farming have changed quite radically in the last 60 years in the catchment and even beef and sheep farming, which have historically been important in the area, look increasingly precarious as small family-run businesses struggle to remain competitive. Like so many other rural areas of Britain, the local landscape is increasingly less a landscape of production, but rather one that is characterised by consumption – a landscape to be consumed by occasional visitors, holidaymakers, and those who live here.

Loweswater is a small community where some big issues are being played out. The Loweswater Care Project has offered some insights not only into the science and ecology of Loweswater, but also into some important cultural and social issues of the day. There are no easy solutions but there are interesting and illuminating puzzles and paradoxes around our concerns. The LCP has shone some light on these and allowed us to think critically and positively about the beautiful but paradoxical place that is Loweswater.

Right: Blue-green algae on Loweswater on the 18th February 2008.
Photo: Judith Tsouvalis.

Bottom: Loweswater.
Photo: Lisa Norton.

Loweswater's blue-green algae - a matter of concern...

Claire Waterton,
Centre for the Study of Environmental Change (CSEC), Department of Sociology, Lancaster University

Above: Blue-green algae on Loweswater on the 18th February 2008.

In the last ten years or so, algal blooms such as the ones seen on this page have become an increasingly frequent sight in Loweswater. These blooms are caused by blue-green algae (cyanobacteria) that under calm conditions can float to the surface of the lake. When blooming, they tend to form an oily scum that can cover much of the lake or, more commonly, can be pushed by the wind into one area of the lake. Blue-green algae are an indicator and a cause of poor water quality. More importantly, these microscopic organisms which are, in fact, bacteria, can potentially be toxic to animals and humans.

Below: The problem of blue-green algae in the lake began to spark off a series of connections and activities.

Blue green algae became a matter of local concern in Loweswater in the early 1990s when it became clear that they:

- Marred the attraction of Loweswater for locals and visitors, particularly when in bloom;
- Could pose a danger to livestock and other animals (e.g. dogs) due to their potential toxicity;
- Posed a potential danger to people swimming in the lake during and after a bloom;
- Signalled declining water quality;
- Brought to the attention of the Environment Agency the issue of pollution from farms and households;
- Alerted the Environment Agency to the likely failure of Loweswater to meet new lake water quality standards under the European Water Framework Directive; and
- Began to sour relations between the National Trust (owners of the lake) and farmers (land-users around the lake).

People's reactions to what appeared as a purely 'physical' problem

People reacted to what initially appeared to be a primarily physical problem in many different ways.

- Scientists suggested that the chemical element, phosphorus - either from farm fertilisers, farm manures, farm slurry tanks or domestic septic tanks - was getting into the lake and 'feeding' the blue-green algae.
- Many local people as well as agency representatives suspected farmers were to blame for the appearance of the algae.
- Loweswater farmers, in turn, rallied together as a group (the Loweswater Improvement Project) under the leadership of local farmer Danny Leck to address issues they felt they could control. Farm soils were sampled, the application of fertiliser was adjusted according to soil sample results, new systems for the separation of rainwater and slurry/septic tanks were put in place on several farms.

- Scientists and locals worked together to gain small grants to put in new septic tanks around domestic and business properties at the north end of the lake.
- The owners of the lake, the National Trust, felt they had no way of addressing this problem except to post warning signs around the lake.

The Loweswater Care Project

The Loweswater Care Project (or LCP for short) was formed in 2008 to build on all the activities that were coming into being around the problem of blue-green algae in Loweswater.

The rationale behind the LCP was to create a meeting-ground where local people, agencies, scientists and anyone who cared about Loweswater could come together on equal terms and pool their diverse knowledges and understandings of blue-green algae in order to identify possible causes and solutions. The forum was run following a number of simple principles that Lancaster University academics adopted from the work of a well-known philosopher of science, Bruno Latour. Prominent among these was the principle that all knowledges and expertise are valuable and open to debate, and that it is important to take disregarded views seriously. Furthermore:

- happenings in nature should not be taken as self-evident but constantly questioned;
- a valid and routine part of making knowledge together is the acknowledgement of uncertainties about facts;
- an open-mindedness towards connections and relations, and a rethinking of these, should be constantly encouraged;
- doubt, fierce debate, and questioning are to be extended to all facts, theories and representations in the LCP.

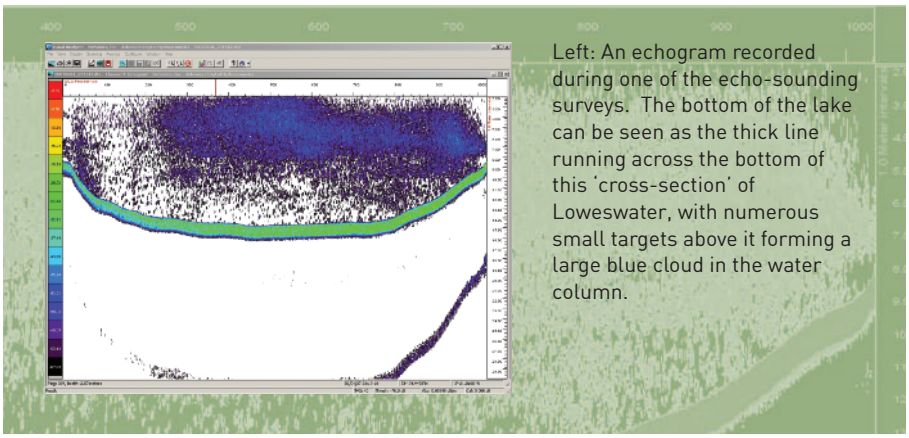
Top: LCP meeting in the Parish Hall on the 15 July, 2009: 'Getting to Know Your Institutions'.

Middle left: Loweswater Parish Hall.

Middle right: LCP meeting on the 18th June, 2008: 'Knowing / Remembering Loweswater – An Evening of Stories / Evidence'.

Bottom: Objects brought in for discussion by LCP participants on the18th June, 2008.

Below: The first echo-sounding survey of the fish populations of Loweswater in 2007. Part of the monitoring system is visible on the port side of the boat.



Left: An echogram recorded during one of the echo-sounding surveys. The bottom of the lake can be seen as the thick line running across the bottom of this 'cross-section' of Loweswater, with numerous small targets above it forming a large blue cloud in the water column.

Between mid 2007 and December 2010, the LCP met fifteen times, roughly every two months. Early on, participants formulated a mission statement:

"The Loweswater Care Project (LCP) is a grassroots organisation made up of local residents, businesses, farmers, ecologists, sociologists, agronomists, environmental agencies and other interested parties. We work collectively to identify and address catchment-level problems in an inclusive and open manner. The LCP's vision is to gain a better understanding of the diverse challenges faced by the Loweswater catchment and together to seek economically, socially and ecologically viable ways forward and put them into practice."

One of our main achievements has been working together, doing science together, listening to and understanding local experiences, and connecting up very different narratives about Loweswater.

Through this, we have come to a much fuller understanding of this complex environment – of the lake, of local relations, of relationships between farm livelihoods, land use and water quality, of agency and institutional responsibilities, of the boundaries of scientific knowledge, and of the opportunities and constraints that we face when thinking about how to deal with (or live with) blue-green algae in Loweswater.

What have these principles meant for the way science is done in the Loweswater Care Project?

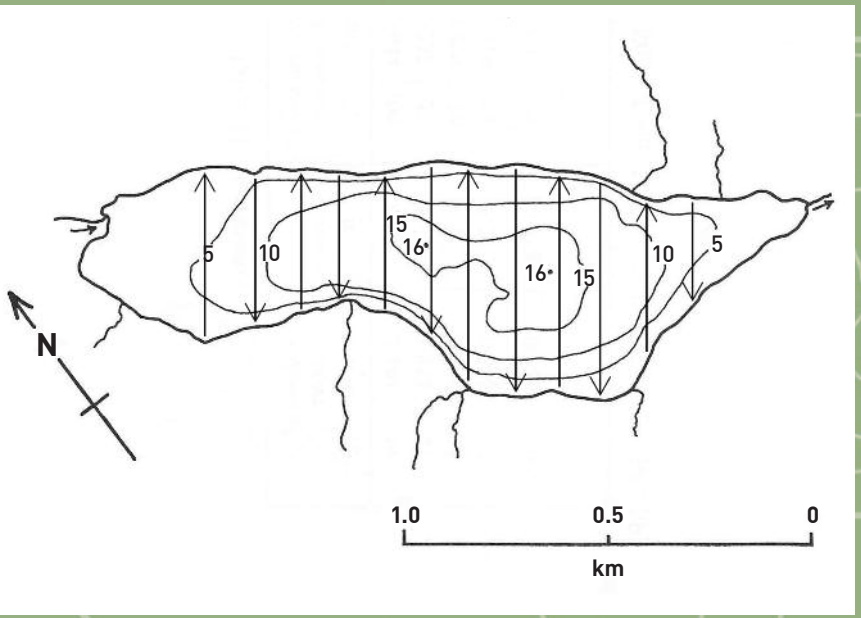
Science in the public domain

Stephen Maberly, Centre for Ecology and Hydrology (CEH), Lancaster

Natural scientists are trained to think and work with phenomena that are tangible and quantifiable, but this project has required me to shift out of my comfort zone into another area by working with social scientists and local residents. Why is this hard? First, because I am not trained as a social scientist and do not have the necessary background knowledge. Secondly, the natural and social sciences have different vocabularies that need translating before communication can be effective. Thirdly, there is a reduction in predictability when social elements are included.

Therefore, in trying to understand complex environmental systems, making links between ecology and economy, for example, can be particularly difficult. Overall, I sometimes feel that I am being pushed to the limit! Nevertheless, I am keen to use my specialist knowledge to improve lake condition and it is clear to me that this can only be achieved in a social context that includes different kinds of experts and stakeholders, and most importantly, the community living and working in the catchment. However, a natural scientist can offer a detailed understanding of the processes leading to an environmental problem, such as poor water quality, allowing possible solutions to be explored with the community and agencies. This will lead, hopefully, to the identification of sustainable solutions that are effective but also practical and balance the needs of the local ecology with the local economy.

Above: Creating a flow of data between the monitoring buoy on the lake and CEH at Lancaster University was achieved via a local farmer's internet connection.



Left: The 12 transects (arrows showing direction of travel across the lake) followed during the echo-sounding surveys of Loweswater, together with the underlying depth contours (in metres).

Below: semi-natural vegetation managed by farmers to act as a buffer zone at the north end of Loweswater, 2009. Photo: Lisa Norton.

The importance of social scientific understandings

Judith Tsouvalis, Centre for the Study of Environmental Change (CSEC), Department of Sociology, Lancaster University

Thirty-eight people contributed a wealth of information about Loweswater in semi-structured interviews carried out at the beginning of the Loweswater Care Project. Their memories of land-use changes, changes in agricultural practice, and the ways in which relations within the community and the composition of the community of Loweswater have changed over the years painted a rich picture of this fascinating catchment. There were many keen observations of climate and environmental change in Loweswater, and many valuable theories were put forward as to why the quality of the water in the lake might have deteriorated. All these contributed substantially to our understandings of Loweswater, and we used these local observations, memories and theories to inform the research priorities and the meeting agendas of the Loweswater Care Project.

Local knowledge pointed among other things to the need to look more carefully at:

- policy changes affecting watercourse management in catchments like Loweswater;
- the geomorphology of the catchment and its significance for changes in water levels and water quality;
- cultural and demographic changes affecting the care and maintenance of natural and human made landscape features in the catchment, such as drainage channels, lake side vegetation, dry-stone walls, and other features.

Middle left: Iredale place in the 1970s. Photo: Harry Spencer.

Bottom left: Vegetation clearing carried out at the outlet of the lake by farmers in the catchment together with the National Trust. Photo: Ken Bell.

Acting out multiple roles

Ken Bell,
Loweswater resident, farmer, and part-time researcher

The concept of playing the dual roles of farmer and research team member was a new and very rewarding one for me as I was keen to use scientific approaches to manage my land in an environmentally friendly way, but without impacting on productivity. This concern is shared by other farmers in Loweswater. Key in achieving this was to act on the ecological and land use data produced for the catchment by Lisa Norton (Centre for Ecology and Hydrology) and John Rockliffe (Senior Farming Advisor, Mitchells Auction Company Ltd., Cockermouth). Soil samples were taken on each farm and analysed for residual levels of nitrogen, phosphorus and potassium and pH levels. Each farmer was given a full report on "Best Practice" needed to reduce potential overload of these nutrients without affecting output and with the benefit of reducing input costs.

Farmers are notorious for being individualistic and following practices that suit their "own way" of thinking, but following the approach above allowed us to move collectively towards managing the land in a way that would benefit water and lake quality but still enable us to retain our individuality.

One other major benefit that emerged from this project is the improved dialogue and relationship between farmers and agencies such as the EA, defra and the NT.

Above: Swaledales at Hudson Place.
Photo: Ken Bell.

Working together to understand links between farming, land management and water

Lisa Norton,
Centre for Ecology and Hydrology (CEH), Lancaster

The relationship between land managers and the land is fundamental to the nature of the British landscape. In Loweswater, as in the Lake District as a whole, farming shapes both the upland fells and the in-bye land in the valleys. As a farmland ecologist, I am interested in understanding how farming impacts on both the quantity and quality of habitats, recognising that in areas like Loweswater farms contain a variety

Loweswater's social and economic make-up

Alec Bond, local resident

To understand fully all of the issues in the catchment, university researchers mounted a study of the socio-economic structure of the community through interviews with local residents. This highlighted once more the long standing problems of hill farming and the erosion of truly local communities.

Conservation of a particular landscape and associated cultural heritage requires conservation of the socio-economic order, which created that landscape, not just in Loweswater but throughout the National Park. Above all else this requires conservation of hill farming. Today, hill farming operates at the margins of financial viability. A strategy to increase farm income, especially to encourage young people to remain in or return to the industry, is required.

The steady erosion of the local community is the second major problem, particularly the loss of young people. Part of this problem is referred to above, but is exacerbated by the lack of affordable housing, due to the relentless pressure of outside demand for retirement and second homes. Local people often have to leave the National Park to seek affordable homes outside. Hence conservation of the rural cultural heritage is under threat. Loweswater is a scattered community in a designated 'Quiet Area' of the Park subject to restrictive planning control over new buildings.

A solution to these problems is required. The LCP has provided a forum in which it is possible to debate these sensitive issues and connect them to the agencies with responsibilities for the natural and cultural heritage of this area.

Above: National Park managers discuss the latest policies with Loweswater Care Project participants.

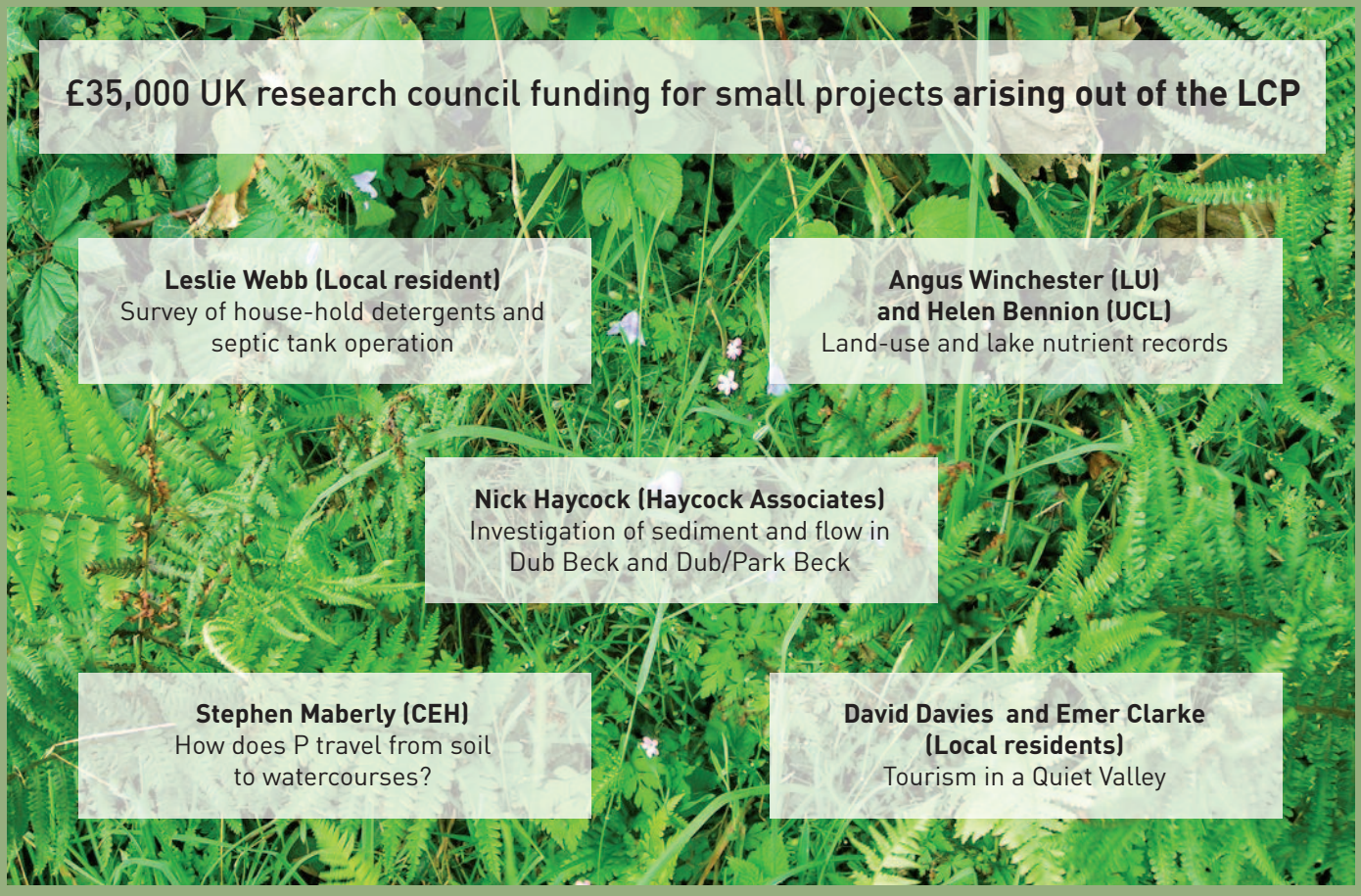
Working together on the algae itself was one thing. Allowing connections to be made from the blue-green algae to other issues that people felt were related was another key principle of our working together.

of habitats besides grassland. As well as the high quality landscape at Loweswater, a couple of important attributes of Loweswater made it a really interesting place to look at relationships between farming and the environment. One was the intimate relationship between land and water in a small catchment where the impacts on the water in the lake (with the exception of atmospheric impacts) were all likely to derive from land management changes. The opportunity to work with colleagues specialising in a different area of ecology to understand the links between land and water has been novel and exciting. Secondly, work at Loweswater has also provided the opportunity to make links between the land managers and the land in very different ways to traditional scientific approaches. These traditional approaches tend to try to simplify inputs to simple numbers representing particular aspects of management. Taking a more holistic approach, made possible by the interdisciplinary and inclusive style of the LCP, provides far greater understanding and mutual respect. I believe this will help to improve catchment management at Loweswater.

The LCP initiated 5 small projects

- **Leslie Webb:**
  What is the contribution of domestic cleaning detergents to phosphorous loads and how well are the domestic sewage treatment plants removing phosphorous before discharge of their effluents and sludges?
- **David Davies:**
  What role might tourism play in the future economic development of Loweswater and how do locals feel about such development?
- **Angus Winchester/Helen Bennion:**
  Can we compare lake sediment samples and their results to historical data and records of land-use and technological changes in the catchment?
- **Stephen Maberly:**
  Do fields with appropriate levels of phosphorus in the soil for agriculture nevertheless lose substantial amounts of phosphorus to Loweswater?
- **Nick Haycock:**
  What does the geomorphology of the Loweswater catchment tell us about the condition of the lake at the present time and what actions might improve water quality?

Science and the LCP - the small research projects



PROJECT A

Survey of local washing practices and septic tank operation in relation to domestic phosphorous inputs to Loweswater Lake – Leslie Webb

One of the main sources of phosphates in Loweswater is sewage discharges from domestic sewage treatment plants at dwellings - this phosphorous comes from toilets, food preparation and the use of phosphates in cleaning compounds. The research encompassed:

- a survey of the use of domestic washing detergents at properties draining to the lake
- a review of the phosphate content of commercially-available detergents, notably for automatic laundry and dish washing machines;
- a survey of the operational state of the existing domestic sewage treatment plants, notably in relation to their ability to remove phosphorous compounds;
- an estimate, based on the above survey data, of the phosphorous loads from sewage discharged within the lake catchment.

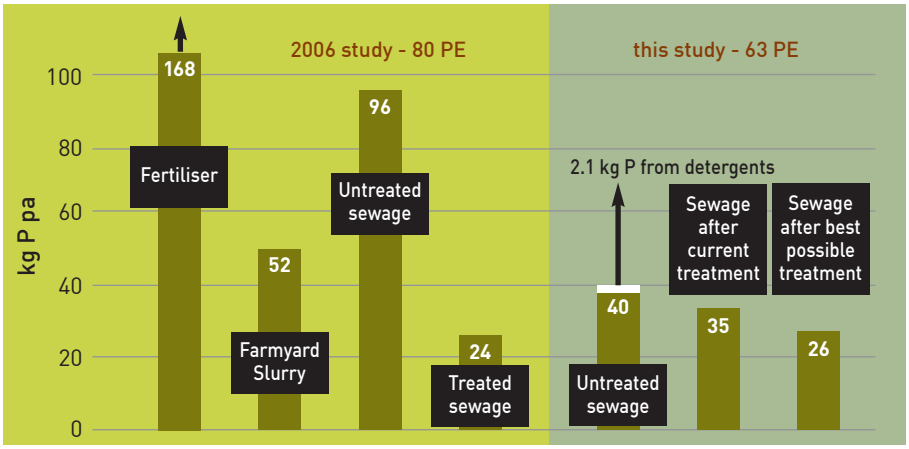
None of the properties surveyed were found to use laundry detergents containing phosphates. While all surveyed properties had laundry washing machines, automatic dishwashers were present at only about 60% of properties. Of these, about 60% used detergents containing more than 30% phosphates. From detergent usage rates at the Loweswater properties, it is estimated that phosphorus from detergents accounts for about 5% of the total phosphorous in raw sewage.

There are 18 domestic sewage treatment plants in Loweswater ranging from rather old, simple septic tanks that only remove particulate solids and store the resultant sludge, to modern "package" plants providing a level of treatment comparable with that at a sewage treatment works serving a village or town. The performance at several of the older plants is limited by several factors such as an inadequate frequency of sludge removal.

The primary sludge removed from some plants is disposed of within the lake catchment and their phosphorus load could thus still reach the lake. The treated sewage effluents are all discharged to land adjacent to the treatment plants.

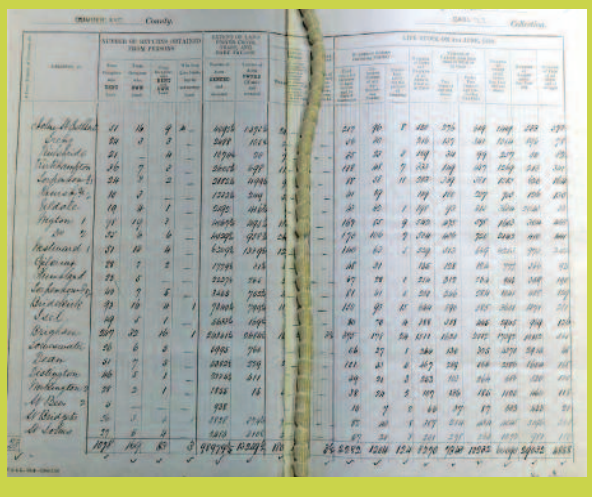
The net removal of phosphorus from the raw sewage in the treatment plants is estimated to be about 13% at present leaving about 35 kg phosphorus per year discharged in effluents and sludges to land within the lake catchment. Under the most favourable conditions for phosphorus removal/retention within the soil, the overall removal of phosphorus by the treatment systems/land could be as high as about 35%, leaving about 26 kg phosphorus per year that could reach the lake. This assumes no further removal in the soil by chemical adsorption on soil particles or by incorporation in growing plants. The latter could well take place, but the effluent phosphorus would be in competition with phosphorus from any fertiliser applied to land in the vicinity of the sewage disposal points. These results are summarised in the figure below.

Estimated phosphorus loads from sewage compared to other sources



PROJECT B

Linking Historical Land-Use Change with Palaeolimnological Records of Nutrient Change in Loweswater – Helen Bennion and Angus Winchester

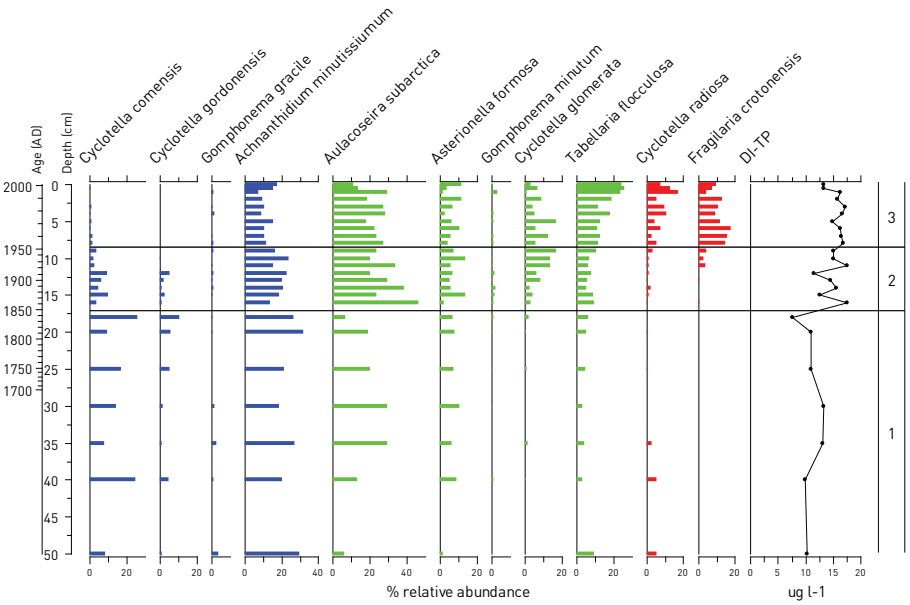


Right: Charting land use change since 1866. Annual agricultural returns: parish summaries, 1866-1988 (The National Archives, MAF 68. Photo: Sarah Rose.

This small project sought to discover whether any relationship could be established between the chronology of nutrient enrichment in Loweswater recorded in environmental evidence, and changing patterns of land use recorded in historical sources (annual Agricultural Returns, which provide statistics at parish level from 1866 to 1988).

- Analysis of the remains of diatoms (single celled, siliceous algae) from the lake-bed core, identified two periods of nutrient enrichment in the lake, one in the mid-19th century, the second c. 1950.
- Linking historical and environmental data suggests that there was a strong relationship between the timing of nutrient enrichment in Loweswater and changing patterns of land use.
- Significant land use changes in the mid-19th century (spread of field drainage, use of lime, intensification of land use) and the mid-20th century (increase in the acreage of improved grassland, increases in livestock numbers, use of artificial fertilisers) correlate with the two periods of major change in the diatom record, strongly suggesting that changes in farming practice over the last 200 years have contributed to the nutrient enrichment of the lake.

Diatom abundances in Loweswater estimated from a core of lake-bed sediment.



PROJECT C

Hydrogeomorphological investigation of the main streams feeding into and out of Loweswater – Nick Haycock

Haycock Associates were commissioned by Lancaster University and The National Trust to undertake a hydrogeomorphological investigation of the streams into and out of Loweswater. The investigation included a detailed field walk undertaken in October 2009 and subsequent analysis of the site in November 2009. The research considered the interaction of the lake level on the geomorphology of the becks that discharge into Loweswater and explored a series of channel and floodplain restoration options.

Findings included:

- there are some contemporary erosion dynamics which could be associated with lowering of the water surface of Loweswater post 1938. Channelisation and revetment of Dub Beck and for a small section of Holme Beck, seem to be associated with drainage works post 1938. Drainage works on Dub Beck and Whittern appear to be more historical, with the culverting of Dub Beck at the Grange Hotel from a much earlier era.
- There appear to be some options to create additional floodplain wetlands, especially on Dub Beck and Whittern Beck, which may result in the reduction of fine sediment entering Loweswater from these catchments.
- There are no recommended options for Holme Beck, apart from allowing the current geomorphological processes to continue. The current rate of erosion may reduce locally to the shoreline if Loweswater lake level was restored.
- The fencing of the incised Highnook Beck valley needs to be strongly considered, in order to reduce sediment supply to the lower sections of the channel, before Maggie's bridge.

PROJECT D

How phosphorus travels from soil to watercourses – Stephen Maberly

The survey of soil-phosphorus that was undertaken in the fields within Loweswater suggested that most had appropriate levels to maximise grass production. However, an appropriate level of phosphorus for production does not necessarily mean that phosphorus does not leach from the soil. This small project analysed phosphorus concentration on eight occasions between March and July 2010 from streams within seven fields with different phosphorus-levels. The stream-survey was undertaken by Ken Bell, a local farmer but also a member of the research team. The results showed that:

- even in streams draining areas with relatively low levels of phosphorus, the concentration of phosphorus can be substantial and in some instances greater than the concentration in the lake;
- there is a real trade-off between maximising food production and sustaining the local economy and livelihoods on the one-hand and the ecology of Loweswater on the other.

PROJECT E

Community and Culture - Tourism in a Quiet Valley - David Davies and Emer Clarke

The purpose of this qualitative research project was to understand people's attitudes towards social and economic development, especially that connected to tourism. Just over half of the 60 people approached provided responses to a questionnaire on this subject. A small number of in-depth conversational interviews were also held which provided more contextualised accounts of aspects of life in Loweswater. Later, LCP participants were invited to consider the results collectively.

Key findings of this study were:

- **Loweswater's population:** there is a predominance of older people; few young people; and few families living in Loweswater;
- **Local economy:** farms are declining; local skills are disappearing; commuting is declining; career starts are not possible in Loweswater; tourism is accepted - there is a hotel, a bothy, a B&B, and a holiday cottage - but large numbers of tourists are not welcomed by the majority. In short, there are few jobs for local people;
- **Housing:** it is too expensive for local and young people to buy; offcomers raise house prices; renting is not readily available and is relatively expensive.

The Loweswater community is now mainly an 'offcomer' community, the majority of whom are originally from metropolitan areas and middle-class backgrounds and whose views and perceptions of the community are about retirement and recreation – not about work and economic development. The older/historical Loweswater was a place of work and employment. The research indicated the existence of perhaps two cultures within the community with crossover between them. The valley is active with mainly retired people and a declining but significant group of farm families.

The study recommends:

- critical thinking and debate about what changes need to occur between those wanting little to change, and those that see the need for larger changes;
- this debate needs to be about the possibility of Loweswater being an active valley that can host young people and families;
- Loweswater residents need to debate the possibility of tourism being a major local economic activity that has the potential to grow;
- new types of investment and employment could be attracted and housing stock for rent could be released;
- a change of culture away from home ownership and towards local sustainability could be explored;
- non-invasive tourism was supported by nearly all respondents, and the research raised the question of whether Loweswater could become a skill-centre and a 'learning valley' using the skills and experience of its entire population.

What agencies made of the LCP

A perspective from the Environment Agency by Charlie Bradshaw

I became involved with the Loweswater Care Project in 2008, explaining the role of the Environment Agency and how we work together with other organisations to tackle issues in the catchment. This included providing information about the Water Framework Directive, one of the main drivers underpinning this project and explaining the current 'moderate' classification for Loweswater lake and the objectives to prevent deterioration and achieve good ecological and chemical status by 2027.

As a result of community involvement, the impact that wider issues have had on the area also emerged, such as changes in population density and demographics, as well as access and recreation. I also remember someone commenting that 'there's always someone from one organisation or another carrying out research or taking samples round here' challenging the co-ordination of research carried out by the many organisations involved. The LCP has now become a hub for receiving and disseminating information and trying to understand these issues. Specific research has been carried out to help fill in the missing pieces; create a more in-depth picture, and ultimately influence improvements. Preventing deterioration of the catchment and adapting to the possible impact of future climate and land use changes are challenges which lie ahead and I look forward to the continuation of this valuable project.

Above: Agency representatives attended many LCP meetings as full participants. However, on one occasion the LCP invited them to form a panel to answer questions put to them by increasingly articulate local people about their roles and responsibilities in the catchment.

Agency representatives from the National Trust, the Environment Agency, the Lake District National Park Authority, Natural England, and others were important participants of the LCP.

Institutional learning

Nigel Watson, Geography Division, Lancaster University

Lessons we can draw from the LCP

The LCP was conceived and developed as an alternative approach to environmental governance. However, it does not have any formal status or power, and is completely reliant on voluntary participation from members of the local community, scientists and the agencies that have responsibility for water and land management in the catchment. In this sense, the LCP is a kind of 'additional' institution which seeks to influence those with power, using a mixture of research, debate and persuasion.

Some key lessons for the LCP and for other similar groups have emerged:

- Environmental problems such as algal blooms can be interpreted and defined in many different ways. Taking time to consider multiple perspectives and arguments is a vital early step towards collaborative action.
- Working across institutional boundaries can be difficult, particularly when agencies are pursuing their own policy objectives, often at very different geographical scales. Specific catchment management projects must be capable of extending their reach and influence beyond

more >

the physical boundary of the catchment itself.
- Agency roles, responsibilities and powers are often defined in law. In these circumstances, agencies can find it difficult to hand over control to a self-organised institution such as the LCP. Groups such as the LCP need to be aware of the power relationships that exist, and to be realistic about the scale and pace of change that is possible.
- Groups such as the LCP need to develop a sophisticated understanding of the institutional landscape in which they are operating, so that recommendations for changes in policy can be 'packaged' and aimed at the most appropriate organisational level or group.
- Informal relationships are vitally important. Mutual trust and respect take time to develop.

Blue-green algae and the LCP: conclusions

Understanding phosphorus flows

From previous research it was already known that phosphorus reaching the water of Loweswater is the main chemical nutrient that 'feeds' or 'limits' the potentially toxic algal blooms in the lake. However, the LCP has clarified some important aspects of the phosphorus-input issue:

- the major land-use in Loweswater, the farming of livestock, has had an impact on the ecology of the catchment due to the release of phosphorus into soil and soil water. This phosphorus eventually finds its way into the lake (see Winchester and Bennion's study and Maberly's study, p. 16 and 17);
- there is therefore a real trade-off between maximising farm productivity and sustaining farm livelihoods on the one-hand, and the ecology of Loweswater on the other;
- farming in upland environments like Loweswater operates at very small economic margins and so changing land-use practices in order to significantly reduce phosphorus flows in the catchment is very challenging;
- the amount of phosphorus reaching the lake from domestic waste waters and sewage has been estimated. Best practice in looking after/emptying septic tanks, and in disposing of sludges out-of-catchment could reduce this amount (see Webb's study, p. 15);
- there may be a potential benefit in considering changes to flood plain management or the fencing around parts of becks to reduce soil erosion into Loweswater (see Haycock's study, p. 17);

The LCP as an example of a new kind of environmental governance was explored at a one-day workshop organized by the LCP on the 3rd of December 2010 in Penrith. Various agency representatives were invited as key speakers and together we explored how the Loweswater Care Project experience squares up with recent developments in 'official' thinking about environmental governance and participatory action, and what the most important insights are that the LCP can pass on to agencies.

Above: Dr. Stuart Burgess addressing the Penrith Conference.

Above: Discussions at the Penrith Conference

- recycling of phosphorus in lake sediments at the bottom of Loweswater will mean it may take time to show the beneficial effects of attempts to reduce phosphorus input into the lake;
- slurry tanks may also be an important source of phosphorus leakage to the lake and should be considered in future research.

Creating a new forum

The Loweswater Care Project valued the views and experiences of scientists, agency representatives, and the general public in equal measure. It encouraged everyone who wished to do so to become involved in the research process and to contribute to discussions and policy-related activities. It fostered social learning and helped build confidence among the 25-35 participants who regularly attended its meetings. Important insights were gained into the complexities of pollution problems and the ways in which the group might address them.

The agenda for the LCP was driven from within the group itself and facilitated by researchers from Lancaster University and CEH. Debates could get very heated, and because of their purposefully open and questioning nature, meetings could appear as too wide-ranging and not focussed enough. And yet, it soon became apparent that concerns held by people within the LCP went way beyond the lake: they extended, for example, to questions encompassing the future of the community and the future of farming. The LCP began, after some time, to be comfortable in making broad connections through its own discussions and preoccupations.

Gradually as we all became more familiar with a very open style of working together, some very productive things began to happen. One of these was that relations between Loweswater's farmers and the National Trust began notably to improve. These two groups decided to collaborate on the management of the main watercourses leading in and out of Loweswater. At subsequent meetings, this was seen as a major achievement of the LCP.

Bringing the public, scientists, and agencies together in such novel ways, the LCP attracted attention regionally and nationally, and we began to liaise with other community-driven groups. LCP representatives gave evidence to the Government's Uplands Inquiry, and to the EA's consultation on the EU Water Framework Directive. Following the Penrith conference discussed above, Dr Doug Wilson of the Environment Agency wrote of the LCP: "**I think the work at Loweswater is probably one of the best examples of participation addressing an environmental issue that I've seen.**"

Postscript

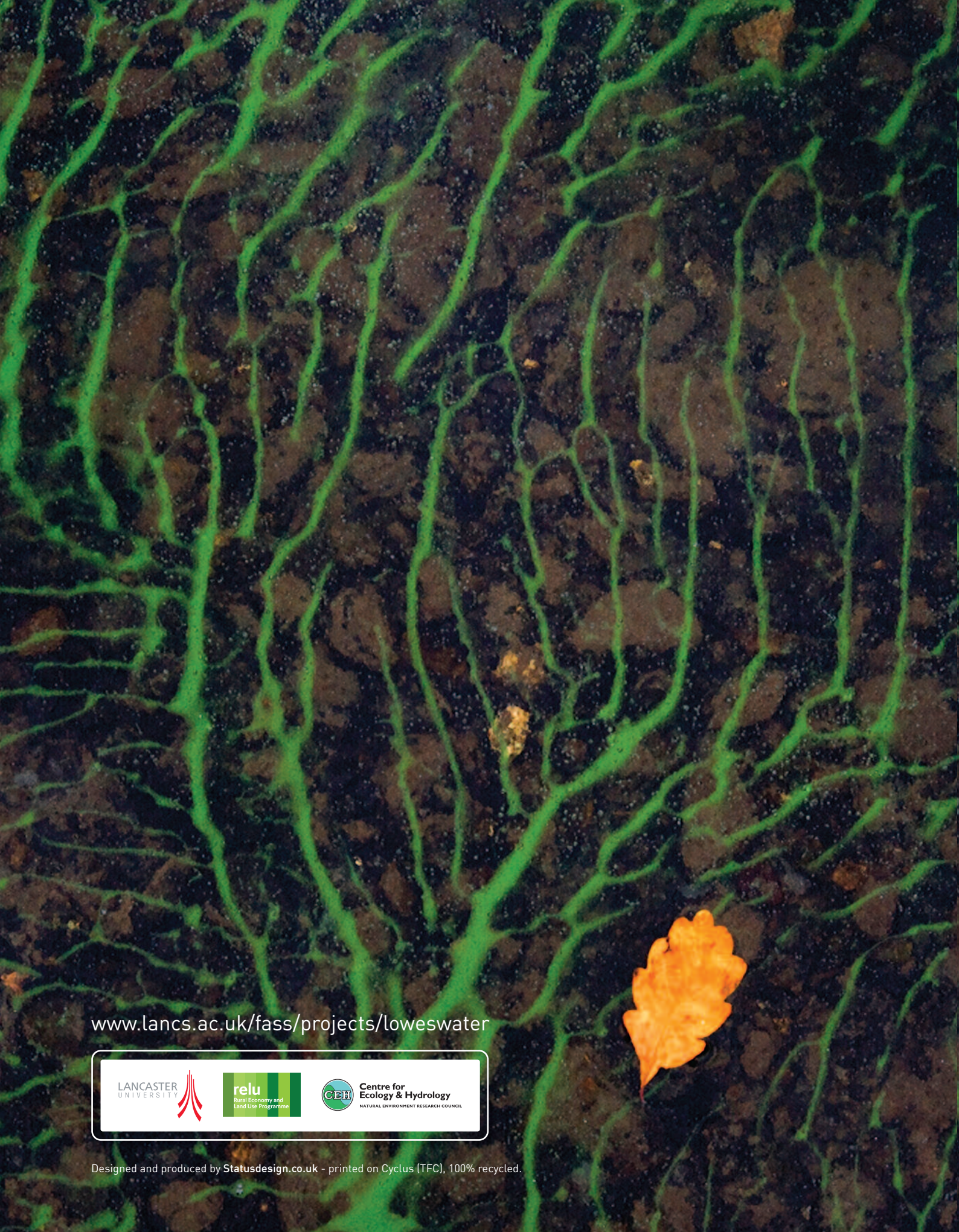
Christine and I moved to the Loweswater valley more than 16 years ago. It is an immense privilege to live here with the constant spiritual uplift and physical challenges of the lakes and fells. No less a joy is being part of the local community, although this is complicated for us by having frequently to go to London for attendance at the House of Lords.

There are, however, huge challenges: the age balance of the community; the growing numbers of "offcomers" like us as against the declining number of local farmers and children; the high cost of housing; the threats to the hill farming which has been such a vital part of the character of the valley; the desire to enable more visitors to enjoy the setting and yet the importance of preserving the tranquility and seclusion which make it special; combining the responsibility of being "trustees" of one of the finest National Parks and preserving its unique character while meeting the changing economic and social needs of a living community; the call to develop a sense of stewardship.

Great appreciation is due to all those who have actively participated in the Loweswater Care Project. It has been an imaginative example of a local community coming together with academics and professionals from relevant agencies to face up to the challenges, identify possible responses and prioritise targets for action. The test, of course, will be what results from it all and the commitment of the Loweswater community to turn analysis in to action. It is good to know that there is determination to maintain the useful networks which the project developed. As the century moves forward there will be new imperatives."

Frank Judd

Lord Judd is President of Friends of the Lake District and a Vice President of the Campaign for National Parks.



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